



December 22, 2008

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**RE: Proposed Acceptance Criteria for Stay-in-place, Insulated Concrete Forms (ICFs) for Constructing Post-and-beam Structural Concrete Walls, Subject AC 361-1208-R2**

Dear Mr. Gerber:

Thank you for the opportunity to comment on the proposed revisions to AC 361. Our staff has reviewed the proposed criteria and we have some suggestions relative to the proposed methodology.

I have listed our suggestions below by section number:

**Sections 1.1 and 1.2:**

These sections state that the goal is to provide a means for the ICF system to be recognized for both “engineered” IBC construction (residential and commercial) and “engineered” IRC construction (residential). However, Section 1.2 caps the seismic design loads at a level that is not “...beyond those specified in IRC Sections R104.11 and R611.” This provision does not seem appropriate for non-residential IBC applications. Should installations be limited to engineered IRC applications only?

Given that these systems do not meet the minimum requirements for ICF walls specified in IRC Table 611.2, and minimum structural performance targets have not been provided for prescriptive construction, we agree with the provision that requires an engineered design in IRC applications. We further suggest this limitation should be explicitly reflected by altering Section 6.2.4:

*“Drawings, calculations, and design details verifying compliance with this report shall be submitted to the code official for approval. The drawings and calculations shall be prepared by a registered design professional ~~when required by the statutes of the jurisdiction in which the project is to be constructed.~~”*

Without this, it appears that an engineered design is not required if the jurisdiction doesn’t specifically mandate it for this system. Not many will have such rules in place for this new system. With no performance targets, the Acceptance Criteria is not structured in a way that assures adequate safety in a prescriptive application.

Section 1.2 states that this criteria applies to all types of construction (I through V) and Section 6.5 states that it is limited to Type V. Should Section 6.5 be revised?

In the absence of evaluated seismic design response factors and cyclic test requirements, we agree with the cover letter that these systems should be limited to structures constructed in Seismic Design Categories A and B.

**Sections 2.0 and 3.0:**

These sections do not contain any provisions to adjust the test results when the concrete or reinforcing steel used for the test specimens perform at a level in excess of the industry specified minimums. Similar adjustments are included in other Acceptance Criteria, should they also be considered for this criteria?

**Section 3.1:**

This section states that the ICF material can be used to resist long-term loading from sources such as soil pressure and cladding gravity loads. If this is the case, then shouldn't the long-term loading performance (creep and load duration) be evaluated for the ICF material?

**Section 3.9.2:**

This section states that the structural properties are permitted to be empirically derived from the test data. What are the rules for the empirical derivation? Minimum sample sizes? Underlying statistics? It would seem as though increased testing and additional empirical evaluation of the critical variables should be investigated if the model fails and the data is used to derive the performance of these field-constructed systems. This provision should be deleted or more guidance provided.

**Section 3.9.3:**

In this section a requirement has been provided for evaluating the confirmation in terms of strength, however, a similar requirement has not been provided for stiffness agreement.

**Section 4.1.3.1:**

A single cycle of moisture soak prior to the bending test does not seem sufficient. It may address conditions during the concrete pour, but it does not address exposure to weather during a prolonged and adverse construction cycle. Should the durability of the ICF composite's bond quality also be evaluated using accelerated aging test methods such as those included in PS-2 for sheathing materials used in similar applications?

**Section 4.1.3.2:**

The out-of-plane load test described in this section describes a test where the infill is pushed into the concrete grid. In application the infill essentially hangs from the grid with a notched cross-section at the perimeter. What about the condition, such as under negative wind pressure, when the infill is pulled from the grid? In this application the load is transferred entirely by tension through the composite material. It is not clear which condition is more restrictive and perhaps both should be reviewed.

**Section 4.3.1:**

The surface loading test described in this section to evaluate the gravity load of the wall coverings is crude and likely insufficient. It seems to address the adherence of the surface load in shear only based upon the load that can be carried for 24 hours. What level of creep is acceptable over that time period? What about tension loads from negative wind pressure? What about different environmental conditions (i.e. hot/cold, wet/dry, etc.). If a field-applied adhesive is used for this purpose, it needs a more rigorous regime of structural testing that includes a range

of installation variables. For example, the regime of testing used to evaluate sub-floor adhesives in ASTM D3498 far exceeds the considerations in this criteria and those products are arguably non-structural in nature.

**Section 5.1:**

Since the ICF material will provide structural resistance as the in-fill between concrete members, minimum quality assurance provisions for structural testing for the ICF should be established in this Acceptance Criteria. At a minimum, a quality assurance test regime that includes: bending, shear, and internal bond (that evaluates the bond quality of the composite) should be specified.

Thank you for consideration of these comments. If you have any questions regarding these comments please don't hesitate to contact me at 208-429-3715 or at Daniel.Cheney2@Weyerhaeuser.com

Sincerely,

*Daniel W. Cheney (sent via e-mail)*

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